10/829,470

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 141 579**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **84307117.6**

(22) Date of filing: **17.10.84**

(51) Int. Cl.⁴: **B 23 K 3/04**

(30) Priority: **24.10.83 GB 8328338**

(43) Date of publication of application: **15.05.85 Bulletin 85/20**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**

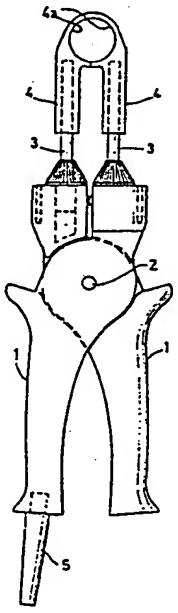
(71) Applicant: **Antex (Electronics) Limited, 14, Great Castle Street, London (GB)**

(72) Inventor: **Gray, Kenneth, Keeping House, Beaulieu Hampshire (GB)**
Inventor: **Tucker, Albert, Lower Treneath Near Rosecraddox, Liskeard Cornwall (GB)**

(74) Representative: **Lee, Philip Graham et al, MARKS & CLERK 57/60 Lincoln's Inn Fields, London WC2A 3LS (GB)**

(54) Heatable tool for heating pipe connector sleeves.

(57) A heatable tool primarily for heating a pipe connector sleeve in order to melt solder provided therein, or applied thereto to secure it to a pipe, comprises a pair of hingedly connected arms (1) each of which at one and the same end has an electrically heatable element (3) disposed in thermally conductive relation to a head part (4) which is formed with a part-circular recess (4a), the arms being movable between an open position in which the part-circular recesses (4a) are spaced apart and a position in which the part-circular recesses (4a) can be closed together around a pipe connector sleeve so as to apply heat thereto.



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M&C FOLIO: 230P48665 WANGDOC: 0166L

"HEATABLE TOOL FOR HEATING PIPE CONNECTOR SLEEVES"

This invention relates to a tool for use in heating a pipe connector sleeve in order to melt, within the sleeve, the solder which serves to secure the sleeve to the pipe by solidification of the solder so as to ensure a fluid tight joint. The solder in the solid state may pre-exist within cavities in the sleeve or may be applied at the points of pipe entry to the tube and flow therein by capillary action when melted.

It is the usual practice to heat these pipe connector sleeves when the pipes are in situ by means of a blow lamp, hot air gun or gas torch. However, application of the flame or hot air to the sleeve usually results in burning of the adjacent part of the building structure. Also the use of a blow lamp or torch in confined spaces is difficult and undesirable if the work has to be done in a combustible environment. The flame or hot air from a blow lamp or torch also tends indiscriminately to heat the other end of the sleeve so that heating a pipe connector sleeve having one end already secured to a pipe can cause the secured end to become unsecured or cause it to leak.

There is thus a need for a tool which overcomes the disadvantages of using a blow lamp or torch for heating a pipe connector sleeve.

According to the present invention in its widest aspect, a tool for heating a pipe connector sleeve, in order to melt solder provided therein, or applied thereto, to secure it to a pipe, comprises a pair of hingedly connected arms each of which at one and the same end has an electrically heatable element disposed in thermally conductive relation to a head part formed with a part-circular recess, the arms being movable between a position in which the part-circular recesses are spaced apart and a position in which the part-circular recesses can be closed together around a pipe connector sleeve so as to apply heat thereto.

The arms may be connected together at one end by a hinge portion which may comprise a flexible or resilient connection integral with the arms in the manner of fire tongs as specifically described in British Patent Application 8328338 from which the present application claims priority.

Preferably however, the arms are pivotally connected intermediate their ends in the manner of a pair of scissors or pliers.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:-

Fig. 1 is a side elevation of a complete tool;

Figs. 2 and 3 are elevations of the inside mouldings which, with other mouldings fit together to form the arms of the tool;

Fig. 4 is a section on line A-A of Fig. 2;

Fig. 5 is a section on line B-B of Fig. 2;

Fig. 6 is a section on line C-C of Fig. 3;

Fig. 7 is a longitudinal section through a heating element; and

Figs. 8 and 9 are sectional views to illustrate the mode of use of the tool in two different pipe joints.

Referring now to the drawings, the tool essentially comprises, as shown in Fig. 1, a pair of arms 1 made of a moulded heat resistant, electrically insulating material pivotally connected by a pin 2 in the manner of pliers. Each arm carries at one and the same end an element 3 for heating a detachable head member 4 which is formed with a semi-circular recess 4a of radius substantially equal to the external radius of a pipe sleeve to which heat is to be applied for melting solder already provided therein or applied to the ends thereof. Also shown is a 3-conductor electric supply flex 5 which extends through one of the arms 1 and is connected through terminal blocks appropriately to each of the two heating elements.

As shown in Figs. 2, 3 and 4 each arm 1 has at one end a socket 1a for receiving an end of a heating element 3, whilst each of the arms is formed internally with cable guide means and an enclosure 1b for locating a terminal connection block (not shown). The heads 4 may be interchanged with other heads having recesses of

a different but identical size to suit different diameter pipe joints.

Referring now to Fig. 7, each heating element comprises a cylindrical ceramic former 5 around which there is coiled a resistance winding 6 with pure nickel or other metallic lead-out wires 7. The winding 6 is surrounded by an alumina tube 8 and the latter is encased in a stainless steel or other metallic tube 9 which transfers heat to the head 4. One end of the tube 9 is closed by a plug 10 whilst the other end has an attached earthing pin 11 and is supported within a bushing 12 made of electrically insulating material and having a bore for accommodating the earthing pin 11.

This bushing 12 which may be externally corrugated as shown in Fig. 1 to assist cooling fits onto the socket 1a, of an arm 1 which is suitably bored to receive the projecting parts of the heating element. As shown in Fig. 1 each head part 4 has a tubular shank into which the outward end of the tube 9 is slidable.

The tool can be optionally fitted with an on/off switch, a variable temperature control circuit and a power-on indicator if required. Further it may be equipped with a guard or shield to enable it to be safely laid down upon an otherwise heat-damageable surface. There may also be provided a mechanism to assist in the changing of the heads 4 when these are very hot.

Means may be provided for automatically aligning the tool heads in the correct plane when slid over the elements and the tool can be made to accommodate elements of various different wattages to operate on various different voltages.

By variation of temperature and by the substitution of an infinite variety of suitably shaped heads, the tool can be used for applying heat to pipes of any cross-sectional shape whether such pipes are made of metal or plastic material. The tool may also conceivably be used for the welding of synthetic material ropes, the soldering of wave guide flanges and the thawing of frozen pipes.

Normally the warm-up time from cold to working temperature is arranged to be between 30 seconds and 3 minutes and the time to complete a soldered metal joint should be less than 10 seconds.

In the use of the tool for the formation of a soldered joint between two lengths of metallic pipe P (Figs. 8 and 9), the tool heads 4 are heated by the respective heating elements when electric current is supplied thereto. The handle parts of the arms 1 are manually gripped and closed towards each other so that the tool heads are brought together to encircle a pipe connector. The pipe connector may be of the so-called "Yorkshire" type as shown in Fig. 8 comprising a cylindrical sleeve C provided with radially inwardly

directed annular recesses in which solder S is stored. When used with such a pipe connector each head recess 4a would be provided with a semi-circular inwardly directed groove 4b in which the part of the sleeve in the region of the recess would be received. Alternatively, as illustrated in Fig. 9, the abutting ends of two tubes P are bridged by a plain connecting sleeve D to which heat is applied by means of the tool as aforesaid whilst a stick of solder T is applied at the point of tube entry. Heat applied by the tool melts the solder which travels by capillary action within the sleeve and solidifies therein to seal the joint. A joint thus formed by use of the tool according to either of these methods provides a seal against egress of liquid or gas.

M&C FOLIO: 230P48665 WANGDOC: 0173L

CLAIMS

1. A tool for heating a pipe connector sleeve (C), in order to melt solder (S) (T) provided therein or applied thereto to secure it to a pipe (P), characterised by a pair of hingedly connected arms (1) each of which, at one and the same end, has an electrically heatable element (3) disposed in thermally conductive relation to a head part (4) formed with a part-circular recess (4a), the arms (1) being movable between a position in which the part-circular recesses (4a) are spaced apart and a position in which the part-circular recesses can be closed together around a pipe connector sleeve (C) so as to apply heat thereto.

2. A tool as claimed in Claim 1 wherein the arms (1) are separate and pivotally (2) connected with one another.

3. A tool as claimed in Claim 1 wherein the arms (1) are joined together at one end by a flexible or resilient connection.

4. A tool as claimed in any of Claims 1 to 3 wherein each heatable element has the form of a shaft (9) on which the head part (4) is detachably mounted.

5. A tool as claimed in any of Claims 1, 2 or 4, wherein an electric supply cable (5) extends through a handle part of one of the arms (1) and is connected to terminal blocks (1b) from which current is supplied to resistance heating wires (6) in the heating elements (3) carried by the arms (1).

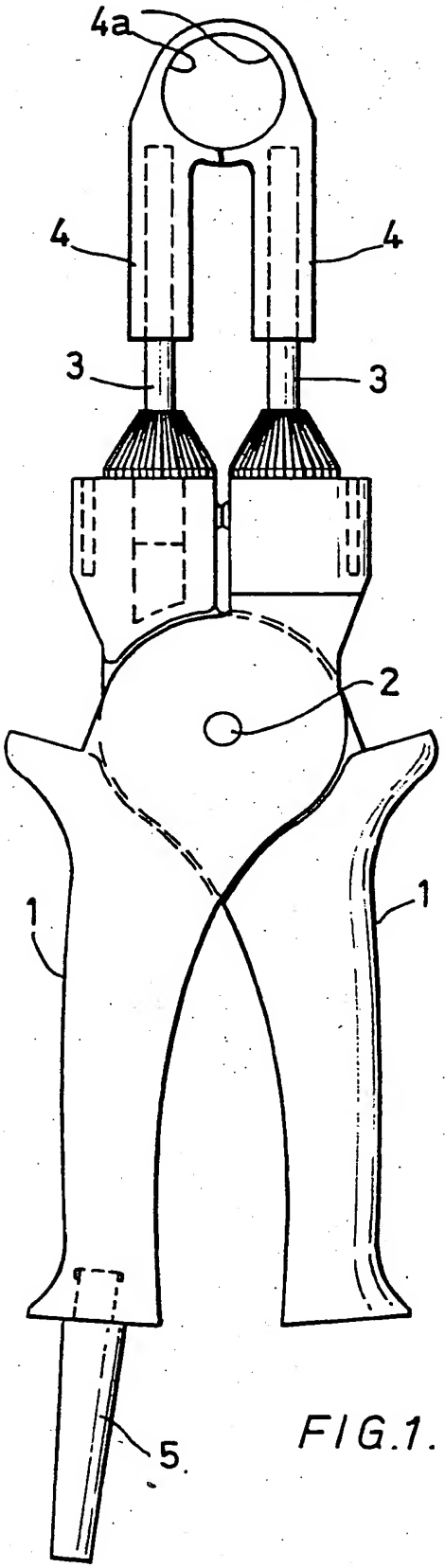

FIG.1.

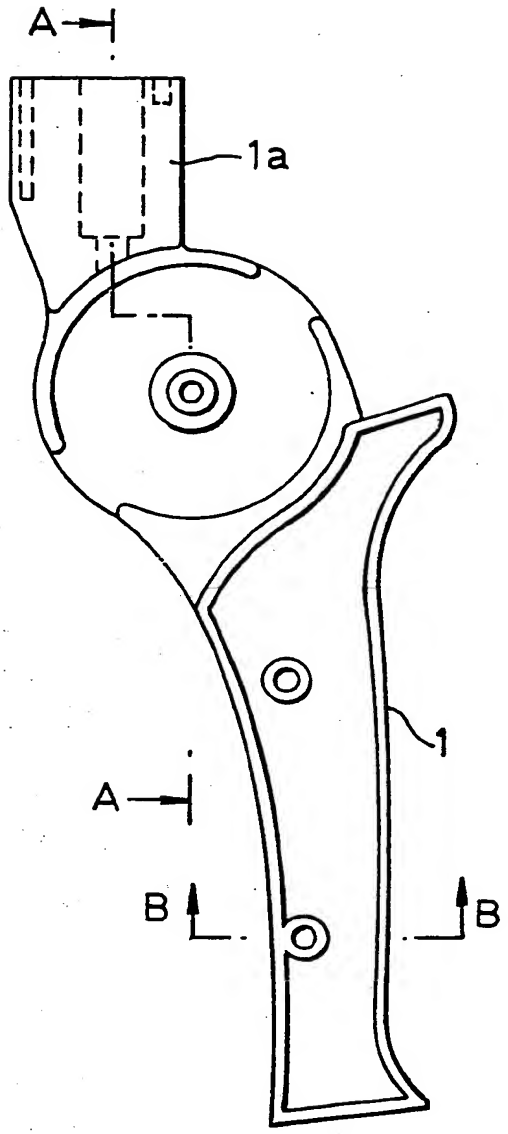

FIG.2.

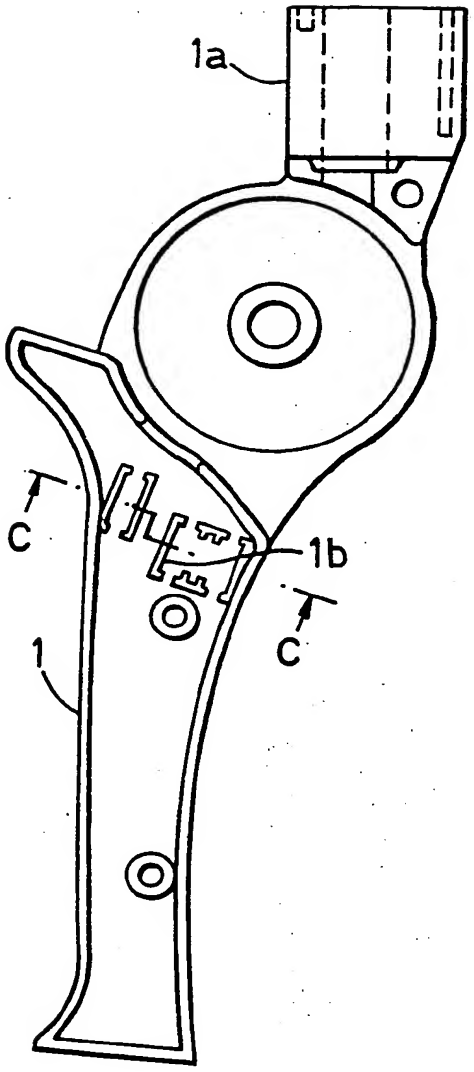

FIG.3.

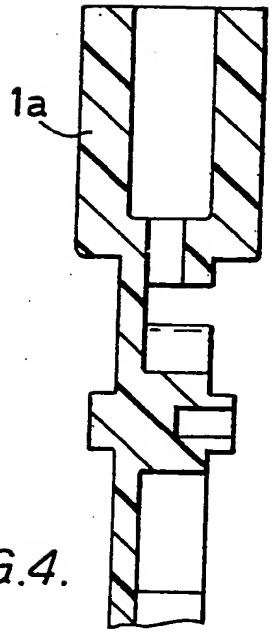

FIG.4.

FIG.5.

FIG.6.

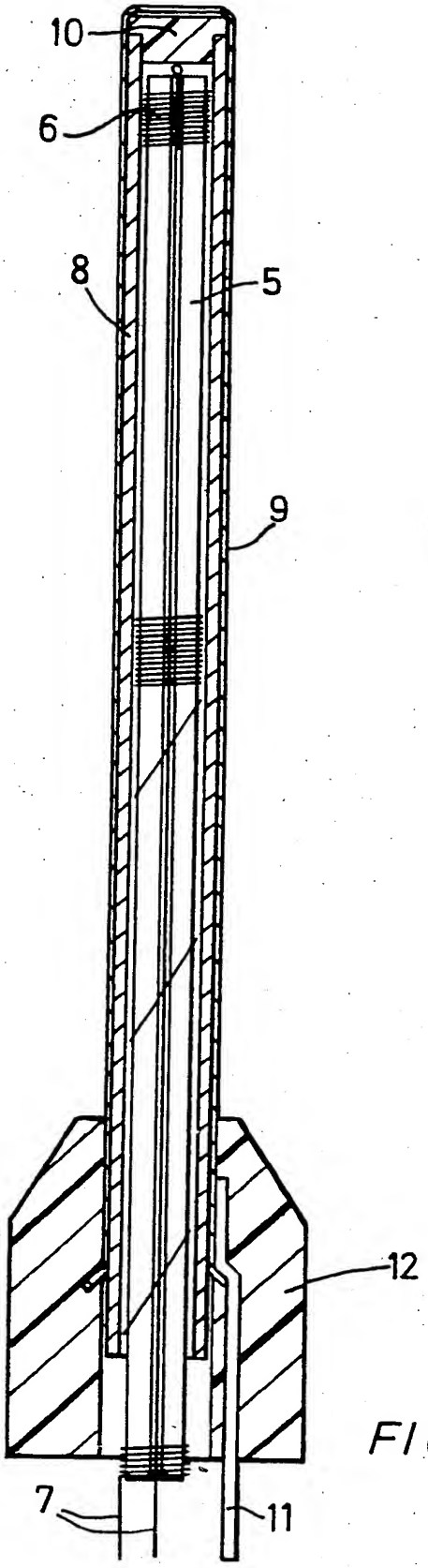

FIG.7.

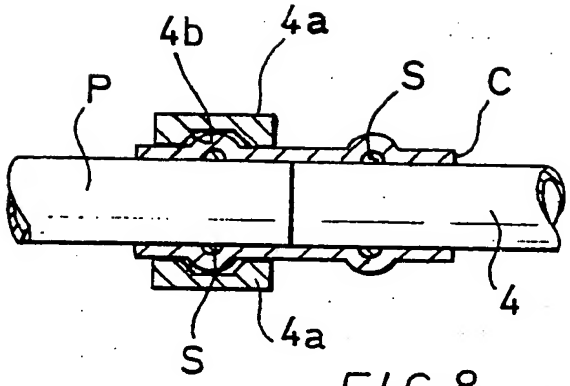

FIG.8.

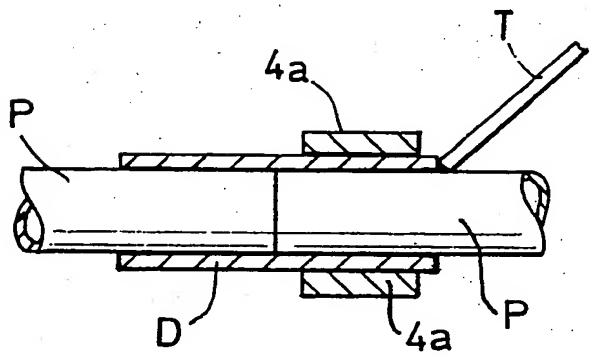

FIG.9.

European Patent Office

EUROPEAN SEARCH REPORT

0141579
Application number

EP 84 30 7117

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-2 830 016 (NISSHIN STEEL CO. LTD.) * Complete document *	1,2,4, 5	B 23 K 3/04
X	GB-A- 480 374 (BRITSH INDUSTRIAL SOLVENTS LTD.) * Figure 1 *	1,2	
A	FR-A-1 151 254 (O. GLAENZER) * Page 2, right hand column, line 23; figure 2 *	3	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)
B 23 K 3/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	24-01-1985	WUNDERLICH J E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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